Space Weather Forecast

Issued on Sunday, 21 April 2024 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated to occasional Moderate class X-ray flares likely. Slight chance minor geomagnetic storm G1 throughout given the potential for coronal mass ejection (CME) influence.

Solar Activity: Solar activity fell to low in the past 24 hours, with frequent mid-level Common-class X-ray flares observed, peaking at 20/1706UTC from one of the many complex sunspot regions near the middle of the facing side of the Sun.

There remain around thirteen active sunspot regions, although the partitioning of the central cluster remains complex. The main regions on the disc at present are AR3639 in the north and AR3645, the latter comprising the largest cluster of spots within the central western cluster. This spot saw growth of peripheral spots and spreading. The final main region of note in terms of complexity was AR3647, although the growth trend here was more stable.

No new clear Earth-directed CMEs have been observed in available imagery. The Moderate-class flare CME of 19 April was analysed, however unpicking its influence from the many minor CMEs in MOSWOC ENLIL is not possible - it is considered likely to add to the complexity of the forecast without dominating.

Solar Wind / Geomagnetic Activity: Solar wind speeds showed a generally steady trend overall, remaining at Slightly Elevated levels near 450km/s. The interplanetary magnetic field (IMF) remained on a stable weak trend, although the important north-south component was perhaps the most notable feature, as although only small-scale it was largely weakly southerly, anti-aligned with Earth's magnetic field.

The net result of the above solar wind measures was for provisionally Quiet to Unsettled Kp indices.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Isolated to occasional Moderate flares likely, with a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast carries very low confidence in detail, however any enhancements are considered to peak in the G1/Minor Geomagnetic Storm range before midweek (UTC, and barring any new events).

There are a number of CMEs expected to pass near Earth, originating from the southeastern quadrant between 18 and 19 April, with the potential for weak glancing impacts throughout the period. Otherwise, fast wind influence from a minor 'coronal hole' may become more reliable over the remainder of the current UTC weekend before gradually and erratically easing into the

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new UTC working week.

Geomagnetic activity is expected to be generally Unsettled for much of the period, however any additional enhancement from CME arrivals will bring the potential for Active to G1 Minor Storm intervals, perhaps most likely in the 72-hour period of the UTC days of Sunday and Tuesday (21 and 23 April).

Energetic Particles / Solar Radiation: Solar radiation storms are considered a slowly increasing slight chance due to the number of more complex sunspot regions moving into the western solar hemisphere.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	20	15
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	70	70	70	70
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	15	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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